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ABSTRACT

To develop a plan for competency based industrial arts curriculum in Virginia, three objectives were set: (1) to survey competency based curriculum developments in other states and prepare a catalog format; (2) to plan and coordinate a competency based curriculum planning conference; and (3) to specify procedures for completing catalogs for industrial arts competencies with criterion references for application and inservice. Of the thirty-three states responding to the initial survey, eleven indicated they were working with competency based instruction at the state level. From information gathered from these respondents a competency catalog format was prepared. On May 22, 1978, a conference on curriculum planning for competency based instruction in industrial arts education was held to assist individuals who had been appointed to advisory committees for the development of competency catalogs. Individuals were trained to work in small groups to advise the writers of catalogs for industrial arts education courses which are included in the Virginia Model Plan for Industrial Arts Education. All materials were reviewed by the Industrial Arts Education Service and will be used by future research groups in their catalog development tasks. It was concluded that competency based instruction is a viable means of improvement and accountability in industrial education for Virginia, and it was recommended that fifteen catalogs of criterion referenced tasks be developed for all approved industrial arts programs for the public schools of Virginia. (Author/JT)

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Final Report

Development of a Competency-Based Instruction Curriculum Plan

Industrial Arts Curriculum Development
Conducted Under
Vocational Education Amendments of 1976
Public Law 94-482

Dr. John M. Ritz
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Old Dominion University
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Norfolk, Virginia 23508

June 1978

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NATIONAL INSTITUTE OF EDUCATION

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Appreciation is also acknowledged of the members of the Industrial Arts Education Service, Division of Vocational Education, Virginia Department of Education for their guidance in this research undertaking. These members include: Thomas A. Hughes, Jr., Supervisor; Marshall O. Tetterton and George Swanik, III, Assistant Supervisors; and Dr. Arvid Van Dyke, Curriculum Specialist.

Finally the researchers would like to acknowledge the commitments of the members of the advisory committees who will guide the future of Competency-Based Instruction in Industrial Arts Education in Virginia. These members include:

Construction and Manufacturing

Mr. Jean S. Anderson
Dr. Allan H. Kaufman
Mr. Bobby R. Pippin
Mr. George E. Dawson
Mr. George F. Pickens

Exploring Technology/Modern Industry Technology

Mr. George Litman
Mr. Ronald W. Anderson
Mr. E. Rodney Fulton
Mr. Ed Thacker
Mr. Michael H. Poyner
Mr. Morris A. Gordon

Communications Technology

Mr. Ricardo V. Gaeta
Mr. Charles L. Smith
Mr. Louis O. Beatty
Mr. Bruce O. Watson
Mr. Frederick J. Stemp
Mr. Henry L. Wyatt

Transportation

Mr. William Sorrell
Mr. Kenneth Williams
Mr. Walter F. Deal, III
Mr. Robert A. Backlund
Mr. Dave Ayers

Materials and Processes Technology

Mr. Paul Cummings
Dr. John M. Ritz
Mr. Erskin F. Jenkins
Dr. Jim Jacobs
Mr. Peter A. Fulcer
Mr. Russell G. Louis

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Summary of the Report

The attached final report responds to the terms of Request for Proposals Number IA 78-4 of the Industrial Arts Education Service, Division of Vocational Education, State Department of Education, Richmond, Virginia 23216. It covers the research period of March 23 through June 30, 1978.

Objectives that were attained through this research included: (1) A survey of competency based curriculum developments completed by other states and educational agencies to prepare a catalog format for industrial arts in Virginia, (2) Plan and coordinate a competency based curriculum planning conference, and (3) Specify procedures for completing catalogs for industrial arts competencies with criterion references for application and inservice.

The procedures that were followed to achieve the above objectives included:

(1) Meeting with the state supervisory staff to outline methods and purposes of the project and review the competency based instruction position paper and action plan.

(2) Surveying competency based instructional materials that are available on industrial arts.

(3) Analyzing available competency based materials to gather data for use in specifying a format for industrial arts criterion reference competency catalogs.

(4) Identifying appropriate curriculum resource personnel and consultants for planning an information conference.

(5) Inviting a consultant, teachers, and supervisors to a training conference for the development of industrial arts criterion referenced competency catalogs.

(6) Preparing a plan for the development of industrial arts criterion referenced competency catalogs.

(7) Publishing the plan for appointed committees and research groups to use in developing competency catalogs for industrial arts education.

(8) Delivering the plan to the industrial arts education service for distribution to appropriate agencies and personnel.

After the researchers contacted the various state departments of education, 33 responded to the initial survey. Of this population, 11 states indicated that they were working with competency based instruction at the state level. From information gathered from these respondents a competency catalog format was prepared for industrial arts education in Virginia. This format was specified in booklet form to be utilized in the future for catalog development.

On May 22, 1978 a conference on Curriculum Planning for Competency-Based Instruction in Industrial Arts Education was held on the campus of Old Dominion University. This conference assisted individuals who had been appointed by the State Supervisor of Industrial Arts Education to Advisory Committees for the development of competency catalogs. Individuals were trained to work in small groups to advise the writers of competency catalogs for industrial arts education courses which are included in the Virginia Model Plan for Industrial Arts Education. The Competency Based Curriculum Plan which was presented at this conference specified the exact procedures for advisory committees and researchers to use and included sufficient information to insure consistency in research procedures and format of the industrial arts competency catalogs with criterion references.

The information generated through this project provided direction and format for further undertakings in competency based instruction in industrial arts education. All materials were reviewed by the Industrial Arts Education Service and will be

used by future research groups in their catalog development tasks.

It was concluded that competency based instruction was a viable means of improvement and accountability in industrial arts education for Virginia, and it was recommended that 15 catalogs of criterion referenced tasks be developed for all approved industrial arts programs for the public schools of Virginia.

DEVELOPMENT OF A COMPETENCY-BASED INSTRUCTION CURRICULUM PLAN
CHAPTER I

INTRODUCTION

The General Assembly in Virginia has approved legislation which requires that local school divisions establish minimum competencies for all their students. In conjunction with this legislation, the department of education has encouraged the implementation of competency based instruction as a means to improve education and its accountability to taxpayers. Under the current five-year plan, vocational education in Virginia has established a commitment to full implementation of competency based instruction by June 30, 1982. Since industrial arts is a part of vocational education, it has a similar commitment to improve instruction in the long-range improvement plan for Industrial Arts Education.

As a part of the improvement program for Industrial Arts Education, the Industrial Arts Curriculum K-12 Model Plan was introduced in the summer of 1977. This model plan outlined the preferred courses, course sequences, and purposes which should be addressed in all industrial arts programs. It included general goals toward which industrial arts programs should direct their attention, however the model did not establish competencies which all learners should possess as they exit particular programs.

STATEMENT OF THE PROBLEM

Since industrial arts in Virginia has adopted a new model plan and has established a commitment to full implementation of competency based instruction

founded upon this plan by June 30, 1982, criteria must be established for the implementation of competency based instruction to become a reality. The problem of this study was to direct attention to one phase of the implementation plan for achieving competency based instruction in industrial arts education: the development of a competency based instruction curriculum plan.

RESEARCH OBJECTIVES

To solve this problem it was the authors' intent to provide clarification and practical application by employing the following objectives as a guide. The researchers would: (1) Survey competency based curriculum developments completed by other states and educational agencies to prepare a catalog format for industrial arts in Virginia, (2) Plan and coordinate a competency based curriculum planning conference, and (3) Specify procedures for compiling catalogs for industrial arts competencies with criterion references for application and inservice.

BACKGROUND FOR THE STUDY

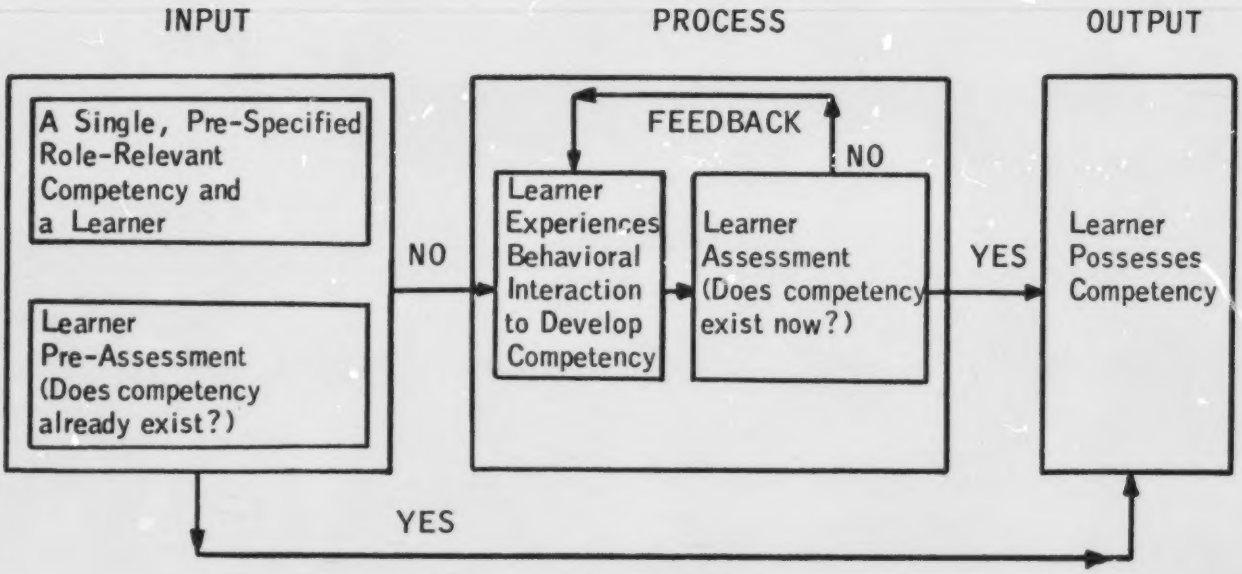
The improvement of education is a continuing concern among teacher educators, teachers, administrators, and the public. While researchers are busily engaged in the lengthy task of determining what makes a good learner and what effect teaching has upon student learning, students are being educated to perform the critical tasks needed for a successful adult life. Consequently, those responsible for educational programs are seeking evidence upon which to design quality academic experience for students.

With the advent of the accountability movement and the evaluation of society and secondary education, a need for developing an educational system which was designed "to develop pre-specified, role-relevant competencies in those who are products of the system" was required (Wright 1977, p. 37). As evidenced by various recent newspaper stories, magazine articles and television news programs the subject such as the 1976 program entitled "Why Johnny Can't Read" aired by NBC, there is a national concern and discontentment with American education. Data from standardized tests reveal widespread failure of the educational system to import even basic communication and numerical skills (Bailey and Stadt, 1973, p. 30). Contemporary parent and citizen groups, joined by legislators and government agency personnel, refuse to accept the shallow explanations for failures that have been used in the past and are demanding that educators and the public schools be held more accountable for the output of the educational process at all levels. The demand is for reform in education.

One systematic approach that has been developed to reform education is competency based instruction. Its roots are found in the specifications required for programmed instruction, and in the future it may emerge as a response to the demands for accountability in education.

Competency-based instruction can be explained as a process of specifying what makes a person competent in a certain subject or field, and then the teaching of these competencies to the learner. In this fashion, a student does not exit from the program or course until he is capable of demonstrating that he has mastered all of its stated content at stated levels. This is illustrated through the process diagrammed in Figure 1.

Figure 1. Subsystems Model for Developing a Competency



The origin of competency-based instruction came about in the 1960's when various colleges began to analyze the tasks required by teachers in the classroom. The general goal of their investigations was to determine skills needed for teachers so they could perform their tasks well (Dyer, 1974, p. 38). From this research, a procedure was developed for constructing competency-based tasks. Burns and Klingstedt describe the tasks analysis process as follows:

> Usually a great deal of research is considered, when available, before competency levels are identified. The way in which the agreed-upon level of competency is communicated is through the use of specific behavioral objectives for which criterion levels of performance have been established. Once the required behaviors have been specified, they are placed in a hierarchy leading from simple to complex; and then an instructional sequence is planned that will help the learner achieve the desired behaviors. When the learner is ready, a test or check of some sort is administered to determine if the required level of competency has been achieved (Burns and Klingstedt, 7).

In competency-based instruction, achievement levels are always held constant, but the time allotted to reach competency may vary. Testing is not conducted in groups for the purposes of ranking and grading; they are administered whenever the student is ready (competent). When measuring for competency, criterion-referenced approaches, as opposed to norm-referenced tests, are utilized. This is because the criterion levels for competency apply to everyone.

In addition to variations in time for the achievement of competencies, learners may also follow alternate routes in becoming competent. Competency-based instruction allows for this by utilizing resource centers, technological aids, and a variety of other experiences.

Basic principles that the system of competency-based instruction is founded upon may be divided into two categories: specific and general. General principles include the characteristics of:

- comprehensive
- systematic
- broad-based decision making
- heavy emphasis on needs assessment
- learner focused
- multiple program options for every set of objectives
- continual evaluation-feedback — adjustment cycle basic part of program
- personalized/modulorized
- regenerative
- field-oriented
- assessment-evaluation used as management tools
- use of technology
- use of open space concept
- instructional teams

(Schmeider, 1973, p. 5)

Schmieder (1973, p. 5) also identifies a number of specific characteristics that are associated with competency-based instruction. These include:

- precise objectives stated in behavioral terms.
- criteria to be applied in assessing the competencies of students is made explicit and public — and negotiable.
- students held accountable for meeting these criteria.
- decision-making regarding training needs based on successful mastery of objectives.
- instructors held accountable for effectiveness of planned program.
- achievement held constant and time varied.
- emphasis placed upon exit requirements with considerable flexibility in entrance requirements.

In all competency-based instruction is set upon a solid philosophical base and is a manageable system that can lead to accountability in our educational institutions.

DELIMITATIONS OF THE STUDY

The research undertaken through this study was limited to surveying information on competency-based instruction from only those personnel responsible for industrial arts education at the state level. Information was solicited only in the area of industrial arts education and not the seven areas of vocational education.

DEFINITION OF TERMS

Following is a list of terms related to this research study. A basic knowledge of these terms should clarify the understanding of this research.

1. Competency-based instruction - a means of education based upon the identification and attainment of prespecified outcomes.

2. Competency catalog - a publication which includes competencies and criterion references for a given area of instruction.

3. Course competency - a prespecified outcome of instruction within a given content area based upon knowledge, skills, and attitudes a learner is expected to possess upon exiting a course.

4. Criterion references - a guideline which gives direction to the standard of attainment of a specific competency.

CHAPTER II

METHODS AND PROCEDURES

METHODS

This project was established to determine a plan for developing a format and procedures for competency based instructional catalogs for the industrial arts curriculum for Virginia. State departments of education were surveyed to determine if they had completed any work on competency based instruction for industrial arts. From this research a format was established for use in Virginia. Materials and committees were assembled to review other undertakings and to train individuals to assist in advising the development of catalogs of industrial arts competencies with criterion references. Those persons trained by the competency-based instruction conference will later work in small groups to advise future research projects to develop industrial arts competency catalogs for each of the courses in the Virginia Industrial Arts Model Plan. The competency based curriculum plan which resulted from this project specified the exact procedures for committees and research groups to use and included sufficient information to insure consistency in research procedures and format of the Virginia industrial arts competency catalogs with criterion references.

PROCEDURES

The objectives of this study provided a context for guiding the authors in their research to establish a format for competency catalogs for industrial arts. Procedures that were established to attain these objectives included the following tasks.

The researchers:

1. Met with state supervisory staff to outline methods and purposes of the project and reviewed the competency based instruction position paper and action plan.

2. Surveyed competency based instructional materials that were available on industrial arts.

3. Analyzed available competency based materials to gather data for use in specifying a format for industrial arts criterion referenced competency catalogs.

4. Identified appropriate curriculum resource personnel and consultants for planning an information conference as approved by the state supervisor.

5. Invited a consultant, teachers, and supervisors, as approved by the state supervisor, to a training conference for the development of industrial arts criterion referenced competency catalogs.

6. Prepared a plan for the development of industrial arts criterion referenced competency catalogs and inservice training.

7. Published the plan for appointed committees to use and review by the state supervisor.

8. Delivered the plan to the industrial arts education service for distribution to appropriate agencies and personnel.

9. Prepared a final report of the project for the industrial arts education service.

A P.E.R.T. chart with data (Appendix A) was utilized in planning a schedule to meet the needs of this project. In this manner, the procedures produced results that met the objectives of the curriculum planning project.

CHAPTER III

RESULTS OF THE STUDY

The results presented in this chapter were assembled from the work undertaken by the project co-directors at Old Dominion University. The format used in this chapter was based on the procedures established in the project proposal. The results were presented under each subsequent procedure.

PROJECT ACCOMPLISHMENTS

1. Meet with state supervisory staff to outline methods and purposes of the project and review the competency-based instruction position paper and action plan.

After the project co-directors were notified that their project proposal for the "Development of a Competency-Based Instruction Curriculum Program" was approved, the researchers met in Richmond with Thomas A. Hughes, Supervisor Industrial Arts Education Service and Marshall O. Tetterton, Assistant Supervisor. At this meeting the competency-based instructon position paper and action plan were reviewed and discussed (Appendix B). Research procedures, the identification of a consultant for a competency-based instruction conference, and persons to appoint to advisory committees were reviewed. The results of this meeting provided the researchers with further directions and expectations for their analysis.

2. Survey competency based instructional materials that are available on industrial arts.

One of the initial undertakings by the researchers was to contact the industrial arts supervisors of the fifty states to determine if they have pursued any work on competency-based instruction at the state level. A copy of the survey sent to the

various state departments appears in Appendix C.

From the initial survey, 34 or a 68 percent return was gathered. These respondents are identified in Table 1. Of those who responded to the survey, 11 states or 32 percent of the respondents were working on competency-based instructional materials at the state level. These states are identified in Table 2.

3. Analyze available competency based materials to gather data for use in specifying a format for industrial arts criterion referenced competency catalogs.

Of those 11 states that are presently working on competency-based instructional materials at the state level, a request was made to send any available information sample materials developed in their states showing formats for writing competency statements for industrial arts. After reviewing sample formats, the researchers felt that all states working on competency-based instruction have developed a style to fit their own needs. It was also determined that those formats in use did not meet the needs of industrial arts in Virginia. For this reason, a competency catalog format was designed by the researchers building upon the strong points that were reported by other states. This competency task format is reported in Table 3.

4. Identify appropriate curriculum resource personnel and consultants for planning an information conference as approved by the state supervisor.

After meeting and discussing viable curriculum consultants on competency-based instruction with the state supervisor of industrial arts education services, the 26th yearbook of the American Council on Industrial Arts Teacher Education

TABLE 1

STATE DEPARTMENTS RESPONDING TO

COMPETENCY BASED INSTRUCTION SURVEY

ALABAMA	NEW HAMPSHIRE
ALASKA	NEW MEXICO
ARIZONA	NORTH CAROLINA
CALIFORNIA	OHIO
FLORIDA	OKLAHOMA
GEORGIA	OREGON
IDAHO	PENNSYLVANIA
ILLINOIS	SOUTH CAROLINA
INDIANA	TENNESSEE
IOWA	TEXAS
KANSAS	UTAH
KENTUCKY	VERMONT
MAINE	VIRGINIA
MARYLAND	WASHINGTON
MINNESOTA	WEST VIRGINIA
MISSOURI	WISCONSIN
NEBRASKA	WYOMING

34 of 50 or 68% return

TABLE 2

STATE DEPARTMENT REPORTING

WORK ON CBI AT STATE LEVEL

CALIFORNIA	OREGON
FLORIDA	TENNESSEE
MINNESOTA	VERMONT
NEW HAMPSHIRE	WEST VIRGINIA
NEW MEXICO	WYOMING
NORTH CAROLINA	

11 of 34 or 32%

TABLE 3

SAMPLE TASK

AREA OF COMPETENCE: Identifies the industrial arts course for which the particular task was prepared.

CONTENT/CONCEPT: Identifies the sub-area which the particular task is associated.

TASK: Identifies the knowledge, skills, or attitudes which the learner should possess after completing instruction in the industrial arts class.

CRITERION REFERENCED MEASURE: The means to identify if the learner can successfully perform the stated task.

PERFORMANCE GUIDES: Identifies sub-tasks which lead to the development of the knowledge, skills, and attitudes identified in the tasks.

was reviewed. This publication, entitled Competency-Based Industrial Arts Teacher Education was prepared by leaders in the field working on competency-based instruction. Contact was made with Dr. Lawrence S. Wright (Appendix D) who authored the initial chapter on "Foundations of Competency Based Education." After discussing the nature of our project, he agreed to serve as the consultant at our Conference on Competency-Based Instruction in Industrial Arts Education.

Dr. Wright is currently Assistant Dean, the Graduate College; Program Director, M.S. Degree Program, Industrial Education; Professor, University of Wisconsin-Stout, Menomonie, Wisconsin. He received his BS and MS degrees in Industrial Education in 1947 and 1948 from the Stout Institute, and his Ed.D. degree from the University of Missouri in 1954. He taught at the University of Northern Iowa for 18 years and came to UW · Stout in 1967.

He has authored a drafting textbook, numerous professional journal articles, and completed several research studies. He contributed to the 13th yearbook of ACIATE and is presently co-editor of the Wisconsin Industrial Education Association Newsletter. He served a five-year term as a member of the ACIATE yearbook planning committee, has served three terms as treasurer of ACIATE and was chosen as ACIATE's Man of the Year.

In 1973 he published an eight-part report on the re-evaluation of the base for the professional component of the M.S. degree program in industrial education at UW-Stout which was a validated list of 327 professional tasks of industrial education teachers. In 1974 he contributed to a further refinement of those tasks resulting in The Industrial Education Teacher's Professional Tasks. He also chaired a UW-Stout task force to develop a definition of competency-based education.

5. Invite consultants, teachers, and supervisors, as approved by the state supervisor, to a training conference for the development of industrial arts criterion referenced competency catalogs.

After the initial research to determine a competency catalog format was underway, the researchers, working with the state supervisor, identified those teachers, teacher educators, and supervisors who would serve on the advisory committees to supervise the development of competency catalogs for industrial arts. Table 4 identifies those individuals who were invited to attend the Conference on Competency-Based Instruction for Industrial Arts Education according to advisory area. Figure 2 illustrates the competency catalogs which each advisory committee will supervise and validate.

Having identified those individuals who would serve on the advisory committees, a letter was drafted (Appendix E) and brochure designed (Appendix F) to notify the individuals of their selection and invite them to the May 22, 1978 conference.

6. Prepare a plan for the development of industrial arts criterion referenced competency catalogs and inservice training.

After the format was prepared for structuring competency tasks for industrial arts, the next procedure was to develop a booklet of Instructions on Catalogs of Tasks for Competency-Based Instruction in Industrial Arts Education. This booklet contained the following parts: (1) cover, (2) acknowledgements, (3) preface, (4) table of contents, (5) sample cover sheet, (6) sample inside cover, (7) introduction, (8) the industrial arts curriculum, (9) fourteen sample tasks, and (10) a validation procedure. The contents of the booklet were self-explanatory and

TABLE 4

ADVISORY COMMITTEE ASSIGNMENTS

Construction and Manufacturing

Mr. Jean S. Anderson
Dr. Allan H. Kaufman
Mr. Bobby R. Pippin
Mr. George E. Dawson
Mr. George F. Pickens

Communications Technology

Mr. Ricardo V. Gaeta
Mr. Charles L. Smith
Mr. Louis O. Beatty
Mr. Bruce O. Watson
Mr. Henry L. Wyatt
Mr. Frederick J. Stemp

Exploring Technology/Modern Industry Technology

Mr. George Litman
Mr. Ronald W. Anderson
Mr. E. Rodney Fulton
Mr. Ed Thacker
Mr. Michael H. Poyner
Mr. Morris A. Gordon

Transportation

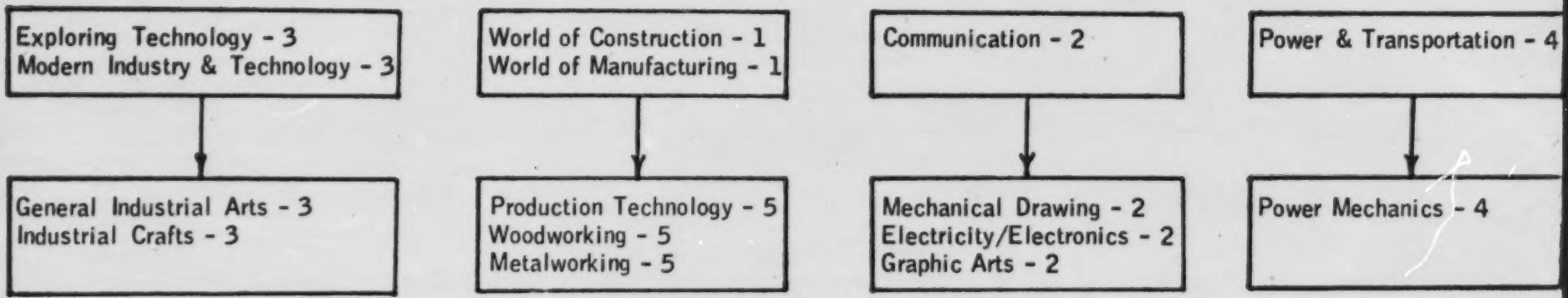
Mr. William Sorrell
Mr. Kenneth Williams
Mr. Walter F. Deal III
Mr. Robert A. Backlund
Mr. Dave Ayers

Materials and Processes Technology

Mr. Paul Cummings
Dr. John M. Ritz
Mr. Erskin F. Jenkins
Dr. Jim Jacobs
Mr. Peter A. Fulcer
Mr. Russell G. Louis

CATALOG DEVELOPMENT AND

ADVISORY COMMITTEE ASSIGNMENTS


Exploring Technology - 3
Modern Industry & Technology - 3
General Industrial Arts - 3
Industrial Crafts - 3
World of Construction - 1
World of Manufacturing - 1
Production Technology - 5
Woodworking - 5
Metalworking - 5
Communication - 2
Mechanical Drawing - 2
Electricity/Electronics - 2
Graphic Arts - 2
Power & Transportation - 4
Power Mechanics - 4

ADVISORY COMMITTEES

1 - Construction and Manufacturing

2 - Communication Technology

3 - Exploring Technology/Modern Industry & Technology

4 - Transportation

5 - Materials and Processes Technology

FIGURE 2

sample competency tasks were prepared for fourteen of the different approved industrial arts programs.

7. Publish the plan for appointed committees to use and review by the state supervisor.

With the competency catalog instructional booklet designed, the next procedure for the researchers was to get the information published for the May 22, 1978 Conference on Competency-Based Instruction in Industrial Arts Education. This was accomplished using the facilities of the Department of Industrial Arts Education at Old Dominion University. A copy of Instructions on Catalogs of Tasks for Competency-Based Instruction in Industrial Arts Education appears in Appendix G.

8. Deliver the plan to the Industrial Arts Education Service for distribution to appropriate agencies and personnel.

With the publishing of Instructions on Catalogs of Tasks for Competency-Based Instruction in Industrial Arts Education, copies were delivered to the office of the state supervisor of Industrial Arts Education Services for review. With his approval, these materials were disseminated and explained to appropriate advisory committee members at the May 22, 1978 Conference on Competency-Based Instruction for Industrial Arts Education.

At the conference, participants were informed by Dr. Larry Wright, consultant, about competency-based instruction in general and its relationship to industrial arts programs in particular. In addition, the researchers informed participants about the specific plans for the writing of competency catalogs with

criterion references for Virginia industrial arts courses and the role of advisory committee members in this effort. The agenda for this conference appears in Appendix H.

9. Prepare a final report of the project for the Industrial Arts Education Service.

This was the major task for the researchers to complete this project. Enclosed is the final report which is in compliance with the requirements of Industrial Arts Curriculum Development, Vocational Education Contract R.F.P. Number: I.A. 78 - 4.

CHAPTER IV

RECOMMENDATIONS

Based on the results, observations, and conclusions of this study, the researchers submit the following recommendations.

1. The data collected and reported in the report should be available for use by individuals in other states and Virginia who are developing competency catalogs for industrial arts education.
2. It is recommended that research continue on the action plan for competency-based instruction for industrial arts education in Virginia. This includes:
    A. The development of criterion referenced competency catalogs for the 15 state approved industrial arts programs by June 1979.
    B. The development of a systematic inservice training program on the use of industrial arts competency-based instruction catalogs by June 1980.
    C. The design of a systematic plan for the local development of instructional materials to implement competency-based instruction in industrial arts education by June 1981.
    D. The full implementation of competency-based instruction for industrial arts education by June 1982.

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APPENDICES

APPENDIX A - P.E.R.T. of Activities for Development of a Competency-Based Instruction Curriculum Program

APPENDIX B - Competency Based Instruction for Industrial Arts Education Position Paper

APPENDIX C - Competency Based Instruction Survey

APPENDIX D - Correspondence with Consultant

APPENDIX E - Conference Letter

APPENDIX F - Conference Brochure

APPENDIX G - Instructions on Catalogs of Tasks for Competency-Based Instruction in Industrial Arts Education

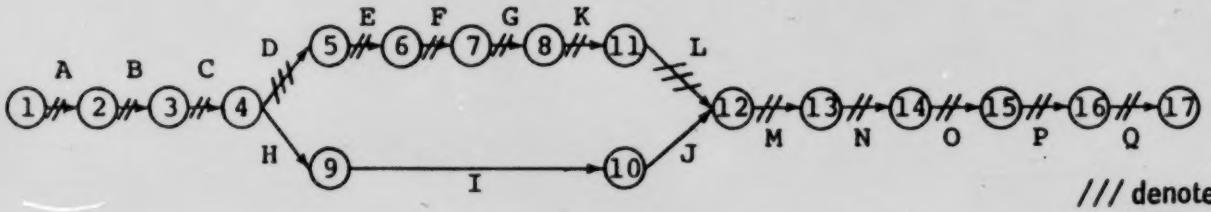
APPENDIX H - Conference Agenda

APPENDIX A

P.E.R.T. OF ACTIVITIES FOR DEVELOPMENT OF A COMPETENCY-BASED INSTRUCTION CURRICULUM PROGRAM

Activities

A. Prepare proposal
B. Await proposal acceptance
C. Plan with state supervisor
D. Identify all I.A. state supervisors
E. Survey state supervisors
F. Analyze competency format data
G. Develop competency format
K. Develop writing plan
L. Publish plan
H. Identify resource personnel
I. Plan conference
J. Invite conference participants
M. Conduct conference
N. Disseminate plan
O. Prepare final report
P. Publish final report
Q. Distribute final report



/// denotes critical path activities

Activity	Predecessor	Successor	Te	ES	EF	LS	LF	Slack	Critical Path
A	1	2	1	0	1	0	1	0	*
B	2	3	2	1	3	1	3	0	*
C	3	4	.6	3	3.6	3	3.6	0	*
D	4	5	2	3.6	5.6	3.6	5.6	0	*
E	5	6	4	5.6	9.6	5.6	9.6	0	*
F	6	7	1	9.6	10.6	9.6	10.6	0	*
G	7	8	1	10.6	11.6	10.6	11.6	0	*
H	4	9	2	3.6	5.6	4.6	6.6	1	
I	9	10	5	5.6	10.6	6.6	11.6	1	
J	10	12	3	10.6	13.6	11.6	14.6	1	
K	8	11	2	11.6	13.6	11.6	13.6	0	*
L	11	12	1	13.6	14.6	13.6	14.6	0	*
M	12	13	.2	14.6	14.8	14.6	14.8	0	*
N	13	14	.2	14.8	15	14.8	15	0	*
O	14	15	4	15	19	15	19	0	*
P	15	16	1	19	20	19	20	0	*
Q	16	17	1	20	21	20	21	0	*

APPENDIX B

COMPETENCY BASED INSTRUCTION

FOR

INDUSTRIAL ARTS EDUCATION

INDUSTRIAL ARTS EDUCATION SERVICE
DEPARTMENT OF EDUCATION
COMMONWEALTH OF VIRGINIA

JANUARY, 1978

ACKNOWLEDGEMENTS

The Action Plan presented here was developed through an appointed committee by the State supervisor of Industrial Arts which addressed the issue of how the Industrial Arts Education Service should deal with the competency based education requirements in the State Plan for Vocational Education and implied through the Standards of Quality for Virginia public schools.

Committee work-sessions were held November 3 and 21 at Norfolk State College and Virginia State College respectively. Between meetings, a sub-committee composed of Dr. David Joyner, Dr. John Ritz, and Mr. Paul Cummings prepared a draft of a position paper.

The committee's work was reviewed by the Industrial Arts Education Service Improvement Planning Team December 14-16 and refined during the Industrial Arts Staff Conference January 12, 1978 into the form presented here.

Appreciation is expressed to the members of the CBI Planning Committee:

Mr. Keith Andrews	Surry County
Mr. Clarence Ash	Norfolk State College
Dr. John Bonfadini	Prince William County
Mr. Paul Cummings	Newport News
Dr. William E. Dugger	Virginia Polytechnic Institute and State University
Mr. Thomas A. Hughes, Jr.	Department of Education
Dr. Harry L. Johnson	Virginia State College
Dr. David I. Joyner	Old Dominion University
Dr. W. V. Payne	Virginia State College
Dr. John Ritz	Old Dominion University
Mr. George Swanik, III	Department of Education
Mr. Marshall O. Tetterton	Department of Education
Mr. Carlton Tew	Petersburg
Dr. Arvid Van Dyke	Virginia State College

COMPETENCY BASED INSTRUCTION

FOR

INDUSTRIAL ARTS EDUCATION IN VIRGINIA

Introduction

The purpose of this paper is to establish an official posture for Industrial Arts Education in the State of Virginia with respect to competency-based instruction(CBI). The target of this work is both an improved instructional system and the implementation of competency-based instruction.

Recent news media presentations have evidenced an intense and genuine concern on the part of government and the citizenry about the quality of American education. Accountability has become an accepted rule for educators in an effort to improve the process of education for the benefit of students. A national movement to improve education has produced several efforts to increase accountability. Among these efforts is competency-based instruction.

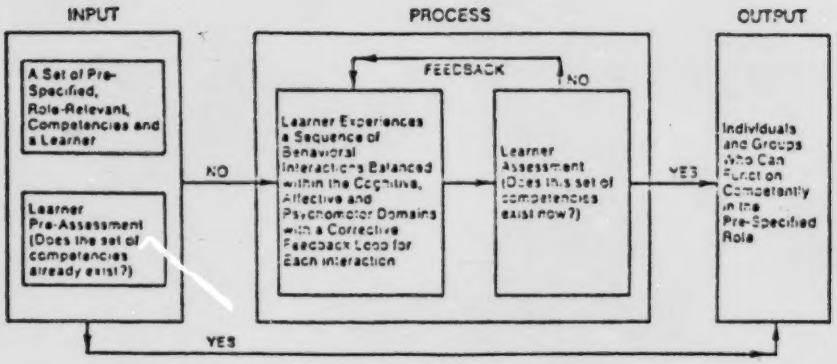
The General Assembly in Virginia has approved legislation which requires that local school divisions establish minimum competencies. In addition, literature from the Department of Education encourages the implementation of CBI as a means to improve education and its accountability to taxpayers.

Vocational Education in Virginia, under the current five-year plan, has a commitment to full implementation of CBI by June 30, 1982. Industrial Arts, as a part of Vocational Education and in an effort to improve instruction, thus has a similar commitment in the Long-Range Improvement Plan for Industrial Arts Education.

Definition of CBI

Competency-based instruction is a means of education based upon the identification and attainment of prespecified outcomes. To be competent implies that a learner be well qualified and possess certain abilities and qualitites within a specified content area. That is, competency-based instruction is a system designed to develop prespecified knowledge, skills, and attitudes in learners who are enrolled in an educational program. Figure 1 diagrams the competency-based instruction process.

Systems Model


INPUT
PROCESS
OUTPUT
A Set of Pre-Specified, Role-Relevant, Competencies and a Learner
Learner Pre-Assessment (Does the set of competencies already exist?)
NO
YES
FEEDBACK
NO
Learner Experiences a Sequence of Behavioral Interactions Balanced within the Cognitive, Affective and Psychomotor Domains with a Corrective Feedback Loop for Each Interaction
Learner Assessment (Does this set of competencies exist now?)
YES
Individuals and Groups Who Can Function Competently in the Pre-Specified Role

WRIGHT, LAWRENCE S., Competency-Based Industrial Arts Teacher Education, Jack C. Brueckman and Stanley C. Breaks, editors, Blommington, Illinois: AMERICAN COUNCIL ON INDUSTRIAL ARTS TEACHER EDUCATION, 1972.

If pre-testing shows that the learner possesses competencies within an area, the area should be by-passed and new content explored. However, if the competnecy does not exist, the learner should encounter learning experiences which brings him/her to the identifiable, pre-specified levels of competence. Thus, for an industrial arts program, the input refers to assessing the specified competencies for each student prior to beginning a course. Students who possess a given competency would not be required to complete related assignments, excluding projects. Students who do not possess the competency would complete related assignments and projects until mastery is achieved.

Although the above statements point to a controllable, pre-specified level of competence for learners who exit an educational program, short comings have arisen around the issue of competency-based instruction. It behooves educators in governing positions to consider and debate the following issues before a final commitment is made as to whether their subject areas should become competency based. These issues include:

1. Can all competencies for a given role be specified?
2. Can all competencies that can be specified be measured?
3. Can competencies accommodate affective education?
4. Should the time period for development of a given competency be specified?
5. Does CBI promote only the teaching of the insignificant through its reliance on analysis of elements and its requirements of measurable outcomes?
6. Does the CBI movement promote a closed system unable to cope with change?
7. Will the profession accept a system which tends to provide the vehicle for holding their accountable?
8. Can the extensive resources required be made available to implement the concept?

It is felt that the above issue can be adequately addressed and competency based instruction has distinct possibilities in Industrial Arts.

The Nature of Industrial Arts Education

The following aim explains the mission of Industrial Arts Education in Virginia. It is a subject area designed to assist each student to develop an understanding about industry and technology and to aid in the discovery and development of individual potential through a variety of courses to accomplish its mission. These courses are found at three levels of public education: elementary, middle or junior high school, and senior high. Through these courses, Industrial Arts can help students to:

- gain an understanding of industry and technology
- discover interests and talents
- develop techniques in problem solving
- develop basic skills in the safe use of tools and machines
- make informed and meaningful occupational choices
- acquire interests in avocational pursuits and hobbies
- develop safe working habits
- apply other school subjects
- become a wiser consumer
- develop creativity
- develop pride in work well done
- work cooperatively with others

Implications for CBI in Industrial Arts

Developing competencies for Industrial Arts courses would require an involvement of teachers representing diverse backgrounds. A careful analysis of the course objectives should produce some competencies that students would be expected to accomplish. A balance of competencies that deal with skills and attitudes, or concepts and activities would be required. From the list of competencies, teachers should be able to develop instructional units.

The competency-based instruction approach to teaching should be directed at those competencies which the student should possess to exit all Industrial Arts courses.

What Needs to be Done

The Industrial Arts Education Service of the Department of Education should provide for the consistent implementation of competency-based instruction by accomplishing the following:

1. Develop complete curriculum materials for each of the courses in the publication entitled "Industrial Arts Curriculum K-12."
2. Develop a competency catalog with criterion references for each of the courses in the curriculum model, except K-6.
3. Develop a consistent inservice program for retraining teachers for the curriculum model and CBI.

A possibility for accomplishing these tasks would be to make curriculum development contracts available which would allow scholarly work by individuals or small groups and full participation by a cross-section of administrators, teacher educators, teachers, and students.

An Implementation Plan

The implementation plan for CBI should be based on the model plan for Virginia Industrial Arts entitled "The Industrial Arts Curriculum K-12." The plan outlines courses, sequences, and purposes which should be addressed in Industrial Arts programs. It also provides indications of outcomes of instruction and guidance as to what exit competencies are expected at each program level.

The logical starting point for developing competency-based materials appears to be the orientation and exploration courses. The approved courses are: Exploring Technology, Modern Industry and Technology, World of Construction, and World of Manufacturing. The goal of these courses is to assist students in making informed and meaningful occupational and educational choices.

Simultaneously, the CBI materials for pretechnical courses should be developed. Communications, Power and Transportation, and Materials Processes are the courses in this program level. The goal for these courses is to prepare for advanced vocational or technical programs.

Concurrently with the pretechnical programs, CBI materials for the personal enrichment courses should be developed. Courses in this area include Mechanical Drawing, Electricity/Electronics, Graphics Arts, General Industrial Arts, Industrial Crafts, Metalworking, Woodworking, and Power Mechanics. The goal for these courses is to prepare students with a general education of consumer information, avocational skills and technical understandings.

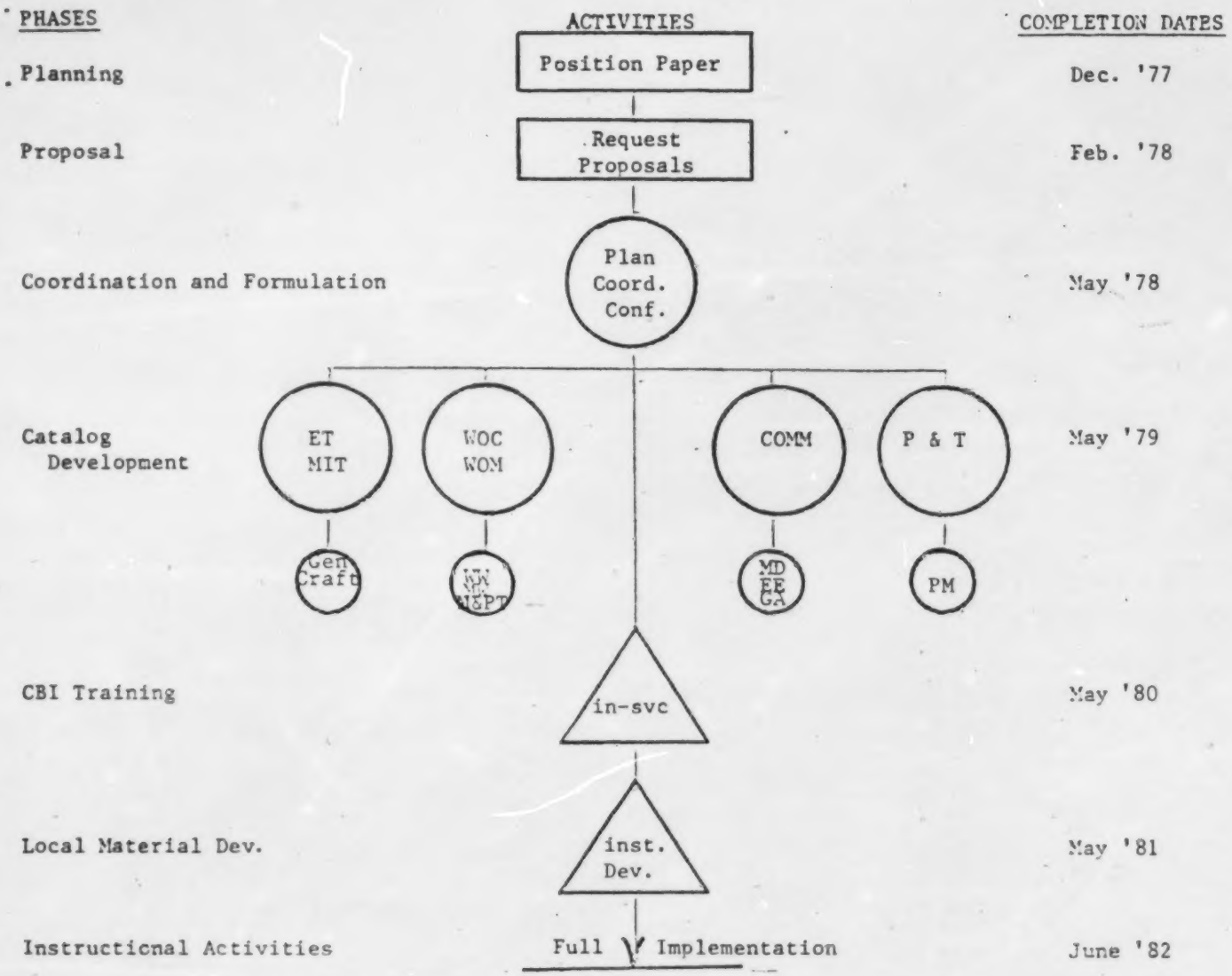
The goal for Elementary Industrial Arts, K-6, is to provide learning reinforcement that contributes to personal development and technological awareness. Since this instruction is intended to supplement the existing elementary school curriculum, it does not appear practical to consider the development of CBI materials at this level.

Teacher education institutions should seek curriculum development contracts with the Industrial Arts Education Service, Division of Vocational Education, to research and develop CBI materials. Requests for proposals should be prepared and disseminated by the Industrial Arts Education Service.

The curriculum development projects should include the participation of a representative sample of the Industrial Arts teachers, supervisors, and teacher educators in the State. The resulting materials should consist of competencies expected of students and criterion references which provide the teacher with checkpoints to determine mastery of competencies specified. Care should be taken to insure consistency in developmental procedures and format of the competency catalogs.

Competency catalogs should be developed by colleges and universities through curriculum development contracts awarded by the Industrial Arts Education Service. The result will be competency catalogs for each of the courses listed in the publication "The Industrial Arts Curriculum K-12" with the exception of K-6 programs. Training sessions will be conducted to train teachers in the use of these catalogs including the development of supplementary materials and teaching methods. The later two aspects of the implementation plan will be the responsibility of school

divisions and individual teachers. The following chart illustrates the implementation procedure:



Summary

Competency-based instruction has become a means of approaching the improvement and accountability of Industrial Arts programs in the State of Virginia. Competency-based education is inferred in the Virginia "Standards of Quality for Public Schools" and directly stated in objectives and strategies in the State plan for Vocational Education.

The Industrial Arts profession in the Commonwealth of Virginia should recognize the unique opportunities afforded by competency-based instruction. We, therefore, acknowledge it as a way to improve programs and to make program evaluation more realistic. We accept the challenge to become more accountable and herewith present a plan of action for implementating competency-based instruction.

OBJECTIVE 4.7 By June 30, 1982, each school division will have implemented competency-based instruction (CBI) based on catalogs of Industrial Arts Competencies with criterion references in their respective Industrial Arts orientation and exploration and pre-technical courses and will have CBI inservice available for personal enrichment courses.

4.7.1 By May 31, 1978, the plan of procedures forrdeveloping catalogs for Industrial Arts competencies with criterion references (IACCR) will be completed through a curriculum planning conference.

4.7.1.1 By January 31, 1978, a curriculum project for providing a curriculum planning conference will be approved through a college.

4.7.1.1.1 By December 31, 1977, an RFP will be released to all colleges having Industrial Arts programs.

4.7.1.2 By January 31, 1978, advisory committees (six persons for each) will be identified by the Industrial Arts Service for the following courses or combinations:

(1) Exploring Technology and Modern Industry and Technology

(2) World of Construction and World of Manufacturing

(3) Communications Technology

(4) Power and Transportation Technology

4.7.2 By June 30, 1979, the following IACCR catalogs will be completed through curriculum development projects:

(1) Exploring Technology competencies with criterion references

(2) Modern Industry and Technology competencies with criterion references

(3) World of Construction with criterion references

(4) World of Manufacturing with criterion references

(5) Power and Transportation with criterion references

(6) Communications Technology with criterion references

4.7.2.1 By April 30, 1978, four RFP's effective July 1, 1978 will be released for catalog development.

4.7.2.2 By September 30, 1978, each catalog writer will consult with their respective advisory committees.

4.7.3 By June 30, 1980, and each year thereafter all new Industrial Arts teachers graduating from Virginia teacher education programs will have received instruction on providing competency based instruction.

4.7.3.1 By January 30, 1979, the Teacher Education Council will have developed a plan for preparing teachers with a C.B.I. background.

4.7.4 By June 30, 1980, IACCR catalogs will be disseminated through regional in-service training projects to all teachers of Industrial Arts courses.

4.7.4.1 By October 31, 1978, state-wide in-service plans will be distributed by the Industrial Arts Service to each school division.

4.7.4.2 By May 31, 1979, the syllabus for each of the five in-service workshops will be developed through the respective project advisory committees.

4.7.4.3 By August 31, 1979, Industrial Arts teachers will be notified of their respective in-service workshops through the summer conference and memoranda.

4.7.5 By June 30, 1981, through continuing projects IACCR catalogs will be evaluated, refined, and published in final form.

COMMONWEALTH of VIRGINIA

DEPARTMENT OF EDUCATION
RICHMOND, 23216

July 1, 1977

INFORMATIONAL MEMO

FROM: Thomas A. Hughes, Jr., Supervisor Industrial Arts Education

SUBJECT: Competency Based Education and The Industrial Arts Curriculum

After considering the presentation and discussions during recent Supervisors-Teacher Education Conferences about C.B.E. and subsequent developments, the following conclusions have been reached:

1. Competency Based Teacher Education (CBTE) is sorely needed because Industrial Arts teaching requires basic technical and teaching competencies. These are currently greatly misconstrued from one institution to another.

2. The Vocational-Technical Education Consortium of States (V-TECS) catalogs of objectives as presented in their current state of development and as usually presented in training workshops are only indirectly applicable to Industrial Arts. In fact, without a careful orientation with teacher, V-TECS workshops may mislead the Industrial Arts teacher.

3. The V-TECS system or method of research could be helpful to improving and developing the Industrial Arts curriculum if the system would adapt specifically to Industrial Arts needs. That is, focus on an analysis of the concepts and functions of industry and technology as a whole rather than through specific job analysis.

4. V-TECS materials are applicable as resource references for Industrial Arts teachers to identify skills needed in various occupations. Should a student be interested in a detailed examination of an occupation, the materials will show activities found in subsequent training programs.

5. The Industrial Arts Education Service policy on C.B.E. is presented in the 1977-82 Industrial Arts Improvement Plan:

   (a) By June 30, 1982, each school division will have implemented competency-based instruction in their respective Industrial Arts orientation and exploration and/or pre-technical courses.

COMPETENCY BASED INSTRUCTION SURVEY
INDUSTRIAL ARTS DEPARTMENT
OLD DOMINION UNIVERSITY

Purpose of this survey: As part of a project to aid in the improvement of industrial arts education in Virginia, we are searching for information concerning "competency based instruction" at the public school level. In particular, we are seeking various writing formats that groups have found helpful in structuring competency statements.

Questions as defined above:

1. Is or has any work been undertaken to identify and write competencies for industrial arts at the state level in your state? YES_____ NO_____

2. To your knowledge, is or has any work been undertaken to identify and write competencies for industrial arts at the local level in your state? YES_____ NO_____

3. If competency work has been undertaken at the local level(s) in your state, who should be contacted for further information?

4. Do you have available any sample materials developed in your state showing formats for writing competency statements for industrial arts? _____ If so, could you please include a copy?_____

5. Do you have available a state guide for industrial arts for your state?_____ If so, could you please include a copy? _____

Thank you for responding.

Name of person reporting:_____

Representing what state:_____

Please return the completed survey and any related information to:

Dr. John M. Ritz
Industrial Arts Department
Old Dominion University
Norfolk, Virginia 23508

OLD DOMINION UNIVERSITY

Old Dominion University • 804-489-6000 • P.O. Box 6173 • Norfolk, Va. 23508

April 13, 1978

Dr. Lawrence S. Wright
Graduate College
University of Wisconsin-Stout
Menomonie, Wisconsin 54751

Dear Larry,

In regard to our April 13, 1978 conversation concerning your consulting responsibilities for our Competency Based Instruction Conference, I would like to formally invite you to assist us in initiating our work. You will be granted an honorarium of for your consulting services plus reimbursement for your travel expenses.

The Conference will be held in Norfolk, Virginia on May 22 from 9:00 a.m. to 3:00 p.m. Approximately 30 local teachers, supervisors, and teacher educators will be invited to begin work on developing competency catalogues for state approved industrial arts courses.

Your presentation is scheduled for the morning session from approximately 9:30 to 12 noon. Topics Dave Joyner and I feel should be treated include:

1. Defining competency-based education
2. Describing the significant events that have led to the competency-based education movement.
3. Differentiating between competency base education and competency based instruction.
4. Describing disadvantages and advantages of competency based education.
5. Characterizing competency based education from existing operational practices.

In all, we are hoping you can educate our participants in the area of Competency Based Education and motivate them in undertaking their catalog development research.

In the afternoon, Dave and I will be making a presentation on how criterion referenced competencies should be written so Virginia will have a consistent format for industrial arts. Your presence and assistance in this practice writing session is also requested.

Please notify us if you accept the consulting responsibilities. If I can be of further assistance, please contact me (804-489-6461-office or 804-855-9206-home).

Sincerely,

John M. Ritz

JMR/pg

Old Dominion University • 804-489-6000 • P.O. Box 6173 • Norfolk, Va. 23508

APPENDIX E

The General Assembly in Virginia has approved legislation which requires that local school divisions establish minimum competencies for all their students. In addition, the department of education has encouraged the implementation of competency based instruction as a means to improve education and its accountability to taxpayers. Under the current five-year plan, vocational education in Virginia has a commitment to full implementation of competency based instruction by June 30, 1982. Since industrial arts is a part of vocational education, it has a similar commitment to improve instruction in the long-range improvement plan for Industrial Arts Education.

You have been appointed by the State Supervisor of Industrial Arts Education to serve on the Advisory Committee responsible for overseeing the development of competency catalogs in Exploring Technology/Modern Industry Technology. This committee is made up of six members. To initiate research in procedures for catalog development, a "Conference on Curriculum Planning for Competency Based Instruction in Industrial Arts Education" is planned. You are invited to attend this workshop on May 22, 1978 at Old Dominion University. Specific details regarding time, location, and reimbursement are included in the enclosed brochure.

Please notify us by May 10 if you plan to attend the conference by completing the form in the conference brochure. If I can be of help in answering any specific questions regarding the conference, please contact me.

Thank you for the time and considerations. We look forward to seeing you on May 22.

Sincerely,

John M. Ritz

JMR:sgw

Enclosure

CONFERENCE PARTICIPANTS

Construction and Manufacturing

Dr. John Bonfadini
Jean S. Anderson
Dr. Allan H. Kaufman
Mr. Bobby R. Pippin
Mr. George E. Dawson
Mr. George F. Pickens

Communications Technology

Mr. Ricardo V. Gaeta
Mr. Charles L. Smith
Mr. Louis O. Beatty
Mr. Bruce O. Watson
Mr. Henry L. Wyatt
Mr. Frederick J. Stemp

Exploring Technology/Modern Industry Technology

Mr. George Litman
Mr. Ronald W. Anderson
Mr. E. Rodney Fulton
Mr. Ed Thacker
Mr. Michael H. Poyner
Mr. Morris A. Gordon

Transportation

Mr. William Sorrell
Mr. Kenneth Williams
Mr. Walter F. Deal III
Mr. Robert A. Backlund
Mr. Dave Ayers

Materials and Processes Technology

Mr. Paul Cummings
Dr. John M. Ritz
Mr. Erskin F. Jenkins
Dr. Jim Jacobs
Mr. Peter A. Fulcer
Mr. Russell G. Louis

ADDITIONAL INFORMATION

Specific questions should be directed to:

Dr. John M. Ritz, CBI Curriculum Plan Co-Director
Department of Industrial Arts Education
Old Dominion University
Norfolk, Virginia 23508
Telephone: 489-6706

PLEASE DETACH AND RETURN BY MAY 10.

Name _____

I will be at the CBI Conference on May 22, 1978. Yes ☐ No ☐

I plan to ride with _____

I plan to room with _____

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CONFERENCE ON CURRICULUM PLANNING FOR COMPETENCY-BASED INSTRUCTION IN INDUSTRIAL ARTS EDUCATION

May 22, 1978

OLD DOMINION UNIVERSITY

Sponsored by

Department of Industrial Arts Education

This project is supported by the Industrial Arts Education Service, Division of Vocational Education, Virginia Department of Education

CONFERENCE ON CURRICULUM PLANNING

FOR COMPETENCY-BASED INSTRUCTION

IN INDUSTRIAL ARTS EDUCATION

PURPOSE

This conference will assist individuals who have been appointed by the State Supervisor of Industrial Arts Education to Advisory Committees for the development of Competency Catalogs. Individuals will be trained to work in small groups to advise the writers of competency catalogs for industrial arts education courses which are included in the Virginia Model Plan for Industrial Arts Education. The Competency Based Curriculum Plan which will be presented at this conference will specify exact procedures for advisory committees and researchers to use and include sufficient information to insure consistency in research procedures and format of the industrial arts competency catalogs with criterion references.

DATE AND TIME

May 22, 1978, 9:00 A.M. until 3:00 P.M.

LOCATION

Room 206 of the Webb University Center on the campus of Old Dominion University in Norfolk, Virginia.

EXPENSES

A limited amount of money is available through a grant provided by the Division of Vocational Education for conference expenses. Accommodations for overnight guests will be provided at the Powhatan Apartments on campus. Where possible, please plan to ride and room with another participant from your area of the State. A list of participants is included. Expenses will be reimbursed within one week after the conference.

PROGRAM

Dr. Larry Wright

Dr. Larry Wright, Assistant Dean of the Graduate College of the University of Wisconsin-Stout, is a national authority on Competency-Based Education in Industrial Arts Education. He will be the consultant and main presenter at the morning session. Dr. Wright will inform participants about CBI in general and its relationship to industrial arts programs in particular. He will also assist with the afternoon program session.

Dr. John M. Ritz

Dr. David I. Joyner

Dr. John M. Ritz and Dr. David I. Joyner, both on the faculty of the Industrial Arts Department at Old Dominion University, are co-directors of the research project which is sponsoring the conference. They will conduct the afternoon session which will inform participants about the specific plans for the writing of Competency Catalogs with criterion references for Virginia industrial arts courses and the role of participants in that effort.

CUT HERE AND RETURN

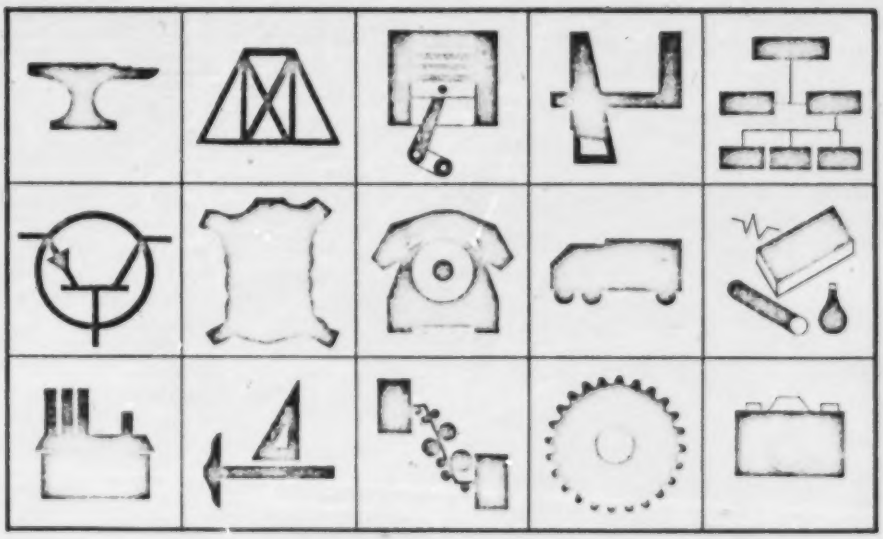
STAMP

Dr. John M. Ritz
CBI Curriculum Plan Co-Director
Department of Industrial Arts Education
Old Dominion University
Norfolk, Virginia 23508

APPENDIX G

INSTRUCTIONS ON CATALOGS OF TASKS FOR COMPETENCY-BASED INSTRUCTION IN

INDUSTRIAL ARTS EDUCATION



A Curriculum Development Project
Funded through the Department of Industrial Arts Education at
Old Dominion University, Norfolk, Virginia by the
Virginia Department of Education
Division of Vocational Education,
Industrial Arts Service, Richmond, Virginia, 23216

These instructions for writing competency catalogs were prepared at

The Department of Industrial Arts Education
Old Dominion University, Norfolk, Virginia

by

Dr. John M. Ritz
Dr. David I. Joyner

For further information concerning this project and catalog write to
Mr. Thomas A. Hughes, Supervisor
Industrial Arts Education Service
Division of Vocational Education
State Department of Education
Richmond, Virginia 23216

PREFACE

In today's complex society, learners need to be prepared to experience situations they will encounter in the future. Recent news media presentations have evidenced an intense and genuine concern on the part of government and the citizenry about the quality of American education. Accountability has become an accepted rule in an effort to improve the process of education for the benefit of learners. A national movement to improve education has produced several important innovations - among these is Competency-Based Instruction.

Competency-based instruction is a means of education based upon the identification and attainment of prespecified outcomes. To be competent implies that a learner be well qualified and possess certain abilities and qualities within a specified content area. That is, competency base instruction is a system designed to develop prespecified knowledge, skills, and attitudes in learners who are enrolled in an educational program.

The format for the development of competency based instructional catalogs for industrial arts education in Virginia is stated in the following pages. This structure was developed after many sources, including the Departments of Education of other states, were reviewed. It is an attempt to establish a consistent format to be used by granted project groups and advisory committees in the development of competency catalogs for all recommended courses in industrial arts education in Virginia.

John M. Ritz
David I. Joyner
Old Dominion University
May 1978

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VALIDATION SURVEY OF COMMUNICATION TECHNOLOGY COMPETENCIES

This study is aimed at validating competencies desired by all students completing identified industrial arts programs in the State of Virginia. Circle the one response which most nearly describes your opinion of each statement. If you feel additional competencies need to be added to the competency list, please note them on the final page of the survey.

An example to show how the survey should be completed is provided:

Key: A - Agree
U - Uncertain
D - Disagree

Example: (A) U D

The Virginia Industrial Arts Student will successfully complete a local evaluation measure to determine if he has developed competence in the area of communication technology.

This response indicates that the individual agrees with the stated item. You may now proceed to complete the questionnaire. Please return the completed survey so that data may be processed to determine those minimal competencies desired of students enrolled in Virginia's industrial arts programs.

THE VIRGINIA INDUSTRIAL ARTS STUDENT WILL:

A U D 1. Define communication technology.

A U D 2. List and explain the following communication systems: person to person, human to machine, machine to machine, machine to human, and supplemental systems.

A U D 3. Explain models of the communication process.

A U D 4. Cite and describe foundational innovations and inventions in in the area of communication technology.

A U D 5. Explain the significance that the introduction of energy systems has had upon the area of communications.

A U D 6. Describe how communication technology has extended the capabilities of our senses.

A CATALOG OF TASKS

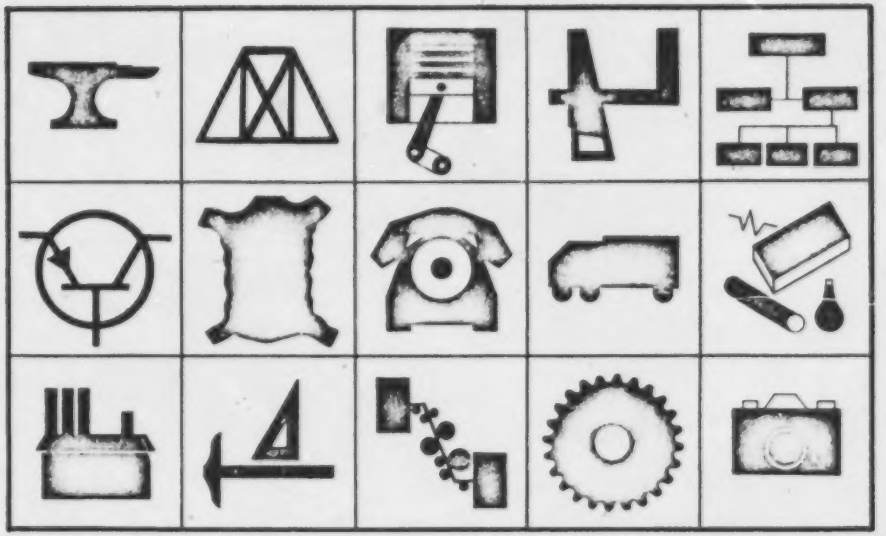
FOR

COMPETENCY-BASED INSTRUCTION

IN

INDUSTRIAL ARTS EDUCATION

CONTENT AREA



A Curriculum Development Project
funded through [name of school and department]
By the Virginia Department of Education
Division of Vocational Education
Industrial Arts Service, Richmond, Virginia 23216.

This Catalog of Tasks
Was Prepared At
[Name of Department (of) Name of University]
By
[Name, Title (Project Director)]
[Name, Title (Project Co-Director)]
[Name, Title (Project Coordinator)]

Members of the Advisory Committee
Who Supervised This Curriculum Development
Project Included

David I. Joyner, Co-Chairman, Old Dominion University
John M. Ritz, Co-Chairman, Old Dominion University
[List other six members and city or institution]
[2.]
[3.]
[4.]
[5.]
[6.]

For further information concerning this competency catalog write to
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State Department of Education
Richmond, Virginia 23216

TASK VALIDATION

After the initial identification of tasks for each industrial arts curriculum program area, the research group should proceed to validate their identified tasks. The procedure that has been established for validation purposes is as follows.

The advisory committee per program area will act as the panel of experts to vote upon the necessity for the inclusion of a particular task into a competency catalog. Each advisory committee is composed of eight members. A vote by survey of at least five positive responses (agree statements) will validate a task as an important measure for attaining competency in a particular program area. If five negative votes are recorded (disagree statements), the task should not be included in the competency catalog.

For those tasks which do not receive enough positive or negative responses to be included or omitted from a catalog (uncertain statements), it is the responsibility of the advisory committee to decide, through dialogue, if the task warrants inclusion in the competency catalog. Following is a sample form of a survey that should be developed and used by each funded project to validate their competency tasks.

Once the tasks have been identified and validated by a research group for a particular program area, a catalog of tasks should be assembled. The procedures to complete this assignment are specified in the beginning pages of this booklet.

SAMPLE TASK # 14

AREA OF COMPETENCE: Woodworking

CONTENT/CONCEPT: Scroll Saw

TASK: Develop skill in performing internal cuts with scroll saw.

CRITERION REFERENCED MEASURE: Make internal cuts with the scroll saw.

PERFORMANCE GUIDES:

1. Observe demonstration on cutting internal designs.
2. Drill a relief hole in center of internal waste stock.
3. Remove blade from scroll saw.
4. Locate stock so the hole and blade will align.
5. Install proper blade for internal cut.

INTRODUCTION

The General Assembly in Virginia has approved legislation which requires that local school divisions establish minimum competencies for all their students. In the Summer of 1977, the Industrial Arts Curriculum K-12 Model Plan was introduced. This plan outlines the preferred courses, course sequences, and purposes which should be addressed in industrial arts programs. However, the model did not establish minimal competencies which all learners should possess as they exit particular courses.

The purpose of the following competency catalog of tasks is to establish a basis from which one may measure to see if individual learners have achieved a minimal level of competence through study in a particular course. In this manner a means to improve education and its accountability to taxpayers can be designed based upon the identification and attainment of prespecified knowledge, skills, and attitudes for the industrial arts content area.

To be competent implies that a learner be well qualified and possess certain abilities and qualities within a specified content area. In preparing this catalog considerable research and validation was undertaken to specify those minimal tasks which every learner enrolling in the course should be able to perform. The format of this and other catalogs includes the following areas: area of competence, content/concept, task, criterion referenced measure, and performance guides. The area of competence identifies the industrial arts course for which the particular task was prepared. Content/concept identifies the sub-area which the particular task is associated. The task is the knowledge, skills or attitude which the learner should possess after instruction in the industrial arts class. Criterion references measures are means to identify if the learner can successfully perform the stated task. Finally, performance guides are sub-tasks which lead to the development of the knowledge, skills, and attitudes identified in the tasks.

On the following page is identified the location of this course in the total program of industrial arts for Virginia. Other competency catalogs for the remaining program may be obtained from the Industrial Education Services at the State Department of Education.

The Industrial Arts Curriculum

Level	Goal	Program
High School	Personal Enrichment	Mechanical Drawing Electricity Electronics Graphic Arts General Industrial Arts Industrial Crafts Metalworking Woodworking Power Mechanics
	Preparatory	Communications Technology Power and Transportation Technology Materials and Processes Technology
Middle or Junior High School	Occupational Orientation and Exploration	World of Manufacturing World of Construction Modern Industry and Technology Exploring Technology
Elementary School	Learning Reinforcement	Industrial Arts activities integrated within the elementary curriculum

SAMPLE TASK # 13

AREA OF COMPETENCE: Power Mechanics

CONTENT/CONCEPT: Small Engines

TASK: Set spark gap on spark plugs.

CRITERION REFERENCED MEASURE: Clean, set, and install spark plugs according to engine specifications.

PERFORMANCE GUIDES:

1. Observe demonstration on setting spark gap on spark plugs.
2. Read assignments on spark plugs.
3. Set spark gap on spark plugs.

SAMPLE TASK # 12

AREA OF COMPETENCE: Metalworking

CONTENT/CONCEPT: Assembling

TASK: Develop skill in assembling with rivets.

CRITERION REFERENCED MEASURE: Select and set metal rivets.

PERFORMANCE GUIDES:

1. Observe demonstration on assembling with rivets.
2. Select the rivets.
3. Check for length and cut.
4. Set rivet by rounding shank.

SAMPLE TASK # 1

AREA OF COMPETENCE: Exploring Technology

CONTENT/CONCEPT: Group Project Model

TASK: Selection of an industry for analysis.

CRITERION REFERENCED MEASURE: Select one industry which will be analyzed using the group project method.

PERFORMANCE GUIDES:

1. Participate in discussions on group project models.
2. Research possible group project models.
3. Present a researched idea on a group project model.
4. Select a final group project model by voting.

SAMPLE TASK # 2

AREA OF COMPETENCE: Modern Industry and Technology

CONTENT/CONCEPT: Finance

TASK: Demonstrate how to properly record the financial transactions of a company using a general journal form.

CRITERION REFERENCED MEASURE: Record the financial transactions of a company using a general journal form including date, description of entry, account number, debit, or credit.

PERFORMANCE GUIDES:

1. Read assignment on general journal forms.
2. Complete assignments using general journal forms.

SAMPLE TASK # 11

AREA OF COMPETENCE: Graphic Arts

CONTENT/CONCEPT: Lithographic Printing

TASK: Develop skills in process photography.

CRITERION REFERENCED MEASURE: Expose and develop copy for line reproduction.

PERFORMANCE GUIDES:

1. Prepare chemicals.
2. Place the copy on the copy board.
3. Adjust process camera.
4. Place the film on the film board.
5. Expose film.
6. Develop film.
7. Clean up darkroom.

SAMPLE TASK # 10

AREA OF COMPETENCE: Electricity/Electronics

CONTENT/CONCEPT: Electrical Circuits

TASK: Solve series - parallel circuits.

CRITERION REFERENCED MEASURE: Solve series - parallel circuits for resistance, voltage, and current.

PERFORMANCE GUIDES:

1. Redraw circuits for clarity.
2. Solve all branches with series resistors.
3. Find total resistance of parallel resistors.
4. Find total resistance.
5. Apply Kirchoff's Laws to solve voltage and current quantities.

SAMPLE TASK # 3

AREA OF COMPETENCE: Manufacturing

CONTENT/CONCEPT: Quality Control

TASK: Develop gauges and quality control devices.

CRITERION REFERENCED MEASURE: Develop the gauges and quality control devices needed for use on a production line.

PERFORMANCE GUIDES:

1. Participate in class discussions on quality control devices and gauges.
2. Study reading assignments on quality control.
3. List various gauges used for quality control.
4. Observe teacher demonstration on the construction of quality control devices.
5. Develop gauges and quality control devices for use on a production line.

SAMPLE TASK # 4

AREA OF COMPETENCE: Construction

CONTENT/CONCEPT: Superstructures

TASK: Identify the component parts of a residential superstructure.

CRITERION REFERENCED MEASURE: Identify and list the following components of a residential superstructure - joists, headers, subfloor, bottom plate, studs, top plate, double plate, sill, rafters, gussets, and ridge board.

PERFORMANCE GUIDES:

1. Read assignments on superstructure components.
2. Participate in demonstration of residential superstructures.
3. Construct a model of a wall section.
4. Label the above model wall section.

SAMPLE TASK # 9

AREA OF COMPETENCE: Mechanical Drawing

CONTENT/CONCEPT: General

TASK: Develop skills in drafting tool identification and use.

CRITERION REFERENCED MEASURE: Identify and demonstrate the useage of a drawing board, t-square, 30^0 - 60^0 triangle, 45^0 triangle, pencil, architect's scale, compass, dividers, and erasing shield.

PERFORMANCE GUIDES:

1. Learn the names of the drafting tools listed below.
2. Observe demonstrations of the correct way to use the drafting tools listed below.
3. Demonstrate the correct useage of each of the drafting tools listed below.

   a. Drawing board
   b. T-square
   c. 30^0 - 60^0 triangle
   d. 45^0 triangle
   e. Pencil
   f. Architect's scale
   g. Compass
   h. Dividers
   i. Erasing shield

SAMPLE TASK #.8

AREA OF COMPETENCE: Industrial Crafts

CONTENT/CONCEPT: Leatherwork

TASK: Develop skill in useage of the swivel knife.

CRITERION REFERENCED MEASURE: Develop skill in the useage of the swivel knife to perform the following freehand cuts - circles, figure eights, and flowing lines.

PERFORMANCE GUIDES:

1. Observe demonstrations on swivel knife useage.
2. Read assignment on swivel knife carving.
3. Demonstrate the following freehand carving techniques using the swivel knife - circles, figure eights, and flowing lines.

SAMPLE TASK #. 5

AREA OF COMPETENCE: Communication Technology

CONTENT/CONCEPT: General

TASK: Identify and describe communication systems.

CRITERION REFERENCED MEASURE: List and explain the following communication systems - person to person, human to machine, machine to machine, machine to human, and supplemental systems.

PERFORMANCE GUIDES:

1. Read assignments on communication systems.
2. Participate in discussions on communicating systems.
3. Cite examples of the following communication systems: person to person, human to machine, machine to machine, machine to human, and supplemental systems.

SAMPLE TASK # 6

AREA OF COMPETENCE: Material and Processes Technology

CONTENT/CONCEPT: Fastening

TASK: Develop skill in fastening by mechanical linkage.

CRITERION REFERENCED MEASURE: Select and perform the following mechanical linkage fastening processes - nailing, screwing, and bolting.

PERFORMANCE GUIDES:

1. Observe demonstrations of fastening by mechanical linkage.
2. Read assignments on mechanical linkages.
3. Fasten stock with nails, screws, and bolts.

SAMPLE TASK # 7

AREA OF COMPETENCE: Power and Transportation Technology

CONTENT/CONCEPT: Energy

TASK: List and describe the expected life span of energy resources.

CRITERION REFERENCED MEASURE: List and describe the expected life span of the following energy resources - gas, oil, coal, hydro-electric, uranium, wind, and solar.

PERFORMANCE GUIDES:

1. Read assignments on energy resources.
2. Participate in discussions on energy resources.
3. Describe the expected life span of the various energy resources.

APPENDIX H

CONFERENCE ON CURRICULUM PLANNING FOR COMPETENCY-BASED INSTRUCTION IN INDUSTRIAL ARTS EDUCATION

May 22, 1978

9:00- 9:10	Opening Remarks by Dr. David I. Joyner
9:10- 9:15	Overview of Competency-Based Instruction Curriculum Planning Process by Mr. Thomas A. Hughes
9:15- 9:20	Introduction of Consultant by Dr. John M. Ritz
9:20-11:45	Overview of Competency-Based Instruction by Dr. Lawrence S. Wright
11:45-12:00	Reactions
12:00- 1:00	Lunch in The Virginia Room
1:00- 1:30	Overview of Competency-Based Instruction in Virginia by Dr. David I. Joyner
1:30- 2:30	Instructions on Catalogs of Tasks by Dr. John M. Ritz
2:30- 3:00	Open Discussion
3:00- 3:15	Completion of Reimbursement Forms